



## Commentary

## We need new tools to assess Orthorexia Nervosa. A commentary on “Prevalence of Orthorexia Nervosa among College Students Based on Bratman’s Test and Associated Tendencies”



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The US physician Bratman’s remarkable observation that some individuals were becoming highly obsessive about healthy eating that drives them into pathology lead him to coin the term Orthorexia Nervosa (ON) (Bratman & Knight, 2000). Since this first report, however, research on ON has only been of mediocre quality. In fact, most studies have been conducted using flawed methodological approaches. As recently reported in an article published in the Journal *Appetite*, yet another study on ON investigating the “Prevalence of Orthorexia Nervosa among College Students Based on Bratman’s Test and Associated Tendencies”, based its findings on an assuagingly flawed methodology (Bundros, Clifford, Silliman, & Morris, 2016).

But first, let us start with an anecdote. Imagine being at a dinner party with your friends. There is a large buffet lined up with all sorts of different foods. A smorgasbord with several salads, cheeses and meats is deliciously arranged. A lot of the presented food is either marked “without XXX”, “free from YYY”, or is described as “vegan”, “paleo” or “gluten-free”. What people bring to dinner parties

reflects individual food preferences and actual food intake. Since self-reported food allergies or intolerances have increased over the last two decades (Rona et al., 2007), people tend to choose more carefully what to eat and what to avoid for sustaining good health. This new food healthism is now accelerated by social media (McBride, 2010; Spence, Okajima, Cheok, Petit, & Michel, 2015), at the same time peculiar beliefs about food and eating are ubiquitous (Bugge, 2015; Casazza et al., 2015; Knight, 2012). Some of these beliefs are without solid scientific support, e.g., gluten-free food being healthier for non-celiac individuals than foods containing gluten (Staudacher & Gibson, 2015). Health-oriented eating is a desirable public health goal in many countries to counteract high rates of obesity associated with unhealthy eating behavior (Ogden, Carroll, Kit, & Flegal, 2014). This is, to a large part, a concession to intervention studies encouraging healthy food choices and limiting the intake of “junk” food and sugary drinks (Lloyd-Williams et al., 2014). In this era of tension, a newly established food regimen dedicated to consume only healthy, pure and mostly unprocessed foods was described more than a decade ago as ON. Bratman coined this term describing when individuals’ endeavor to exclusively eat perfectly healthy had become obsessive as well as dysfunctional (Bratman & Knight, 2000). However, distinguishing a particular eating behavior as just peculiar and only sometimes extreme from being termed “clinically significant” is of great importance to proceed in this field of research.

There are currently many methodological issues regarding research on ON. Bundros et al. (2016) report associations between the Bratman Orthorexia Test (BOT) with validated behavioral and psychiatric measures (Eating Attitudes Test-26 = EAT-26, Body Dysmorphic Disorder Questionnaire = BDDQ, revised version of the Obsessive Compulsive Inventory = OCI-R) on a convenience sample of 448 college students. They found that gender, age, and college major were not significantly associated with BOT scores while reporting significant positive correlations between total BOT scores and EAT-26 ( $r = 0.47, p < 0.01$ ), BDDQ ( $r = 0.25, p < 0.01$ ) and OCI-R scores ( $r = 0.19, p < 0.01$ ). The authors conclude that increased orthorectic tendencies exist among college students with Hispanic/Latino background and that individuals being overweight/obese are

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**Table 1**  
Studies using a) the Bratman Orthorexia Test (BOT) and b) the ORTO-15, ORTO-15 adaptations or other measures to assess Orthorexia Nervosa.

a) BOT				
Study (year)	Name of measure (language)	Validity reported	Short summary	
Bratman & Knight. (2000)	BOT (English)	n.r	The original 10 item yes/no test Bratman described in the book "Health Food Junkies" (Bratman & Knight, 2000).	
Kinzl, Hauer, Traweger, and Kiefer (2006)	BOT (German)	n.r	One of the earliest studies to examine prevalence was Kinzl et al. (2006) assessing 286 nutritionists on what they describe as the "Bratman Test." They report no orthorectic tendencies for 52.3% ( $\leq 1$ positive answer); 34.9% with only mediocre orthorectic tendencies (2–3 positive answers) and 12.8% with high orthorectic tendencies ( $\geq 4$ positive answers).	
Eriksson et al. (2008)	BOT (Swedish)	n.r	Eriksson et al. (2008) coin these 10 items the "Bratman Orthorexia Test," and administer it in Swedish after a single step translation. No prevalence rates reported in the manuscript.	
Korinth, Schiess, and Westenhofer (2010)	BOT (German)	n.r	Korinth et al. (2010) use the same scale, referring to it only as the "ten items." Neither study (using the German BOT) describes in detail the method used to translate the English items into German. No prevalence rates reported in the manuscript.	
Bundros et al. (2016)	BOT (English)	n.r	Bundros et al. (2016) use the original version provided by Bratman to examine associations with body image disturbances among 448 college students. From those 448 college students, 235 (54.3%) were classified as health fanatics or having orthorectic eating attitudes.	
b) ORTO-15				
Study (year)	Name of measure (language)	Adaptation (items discarded)	Validity reported	Short summary
Donini et al. (2005)	ORTO-15 (Italian)	No items deleted (original construction)	n.r	This article describes the creation of the ORTO-15, a 15 item instrument to detect ON based on Bratman's 10 yes/no items. The ORTO-15 is based on a 525 person sample from the community. By identifying individuals who were classified as having both "health fanatic eating habits" and obsessive/compulsive traits and phobia "linked to personality" based on Scale 7 of the original version of the Minnesota Multiphasic Personality Inventory, an orthorexia group ( $n = 121$ ) were identified. A cutoff score of 40 correctly classified 100% of those in the orthorexia group.
Bosi, Çamur, and Güler (2007)	ORTO-15 (Turkish)	No items deleted	n.r	The ORTO-15 is translated into Turkish using a single step design. When administered to 318 resident physicians, nearly half score in the range of ON.
Arusoğlu, Kabakci, Köksal, and Merdol (2008)	ORTO-11 (Turkish)	1, 2, 9, 15	Cronbach's alpha = 0.62	The ORTO-15 was translated into Turkish using a complex, multistep method and administered to 994 members of a university. The authors found through confirmatory factor analysis, that only 11 of the 15 items from the ORTO-15 were needed to identify ON
Fidan, Ertekin, Işıkay, and Kırpınar (2010)	ORTO-11 (Turkish)	1, 2, 9, 15	n.r	This study used the "ORTO-11," an instrument developed from the ORTO-15 by Arusoğlu et al. (2008). When sampling 878 Turkish medical students, more than 40% were believed to suffer from ON.
Ramacciotti et al. (2011)	ORTO-15 (Italian)	No items deleted	n.r	The aim of this study was to determine ON in the "general population." When using the Donini et al. (2005) cutoff score of 40, the prevalence rate was 57.6%. The authors suggest a different cutoff ORTO-15, a score of 35 (derived arbitrarily for a "sensibly lower" prevalence rate), that results in only 11.9% of their sample scoring in the ON range.
Alvarenga et al. (2012)	ORTO-12 (Portuguese)	1, 2, 15	Cronbach's alpha = 0.39	The ORTO-15 was translated into Portuguese using a multistep method, using both the published English items and its original items in Italian. In a sample of 392 Brazilian dietitians, more than 8 out of 10 score in the ON range. This group also report severe reservations regarding the ORTO-15 based on its psychometric properties.
Segura-García et al. (2012)	ORTO-15 (Italian)	No items deleted	Cronbach's alpha = 0.79	An examination of 577 Italian athletes, where 28% of women and 30% of men scored in the ON range on the ORTO-15 using a cutoff score of 35.
Varga, Thege, Dukay-Szabó, Túry, and van Furth (2014)	ORTO-11-Hu (Hungarian)	5, 6, 8, 14	Cronbach's alpha = 0.82	These authors translated the ORTO-15 into Hungarian using a complicated, multistep procedure. The translated ORTO-15 was administered to 810 university students. Confirmatory factor analysis also revealed that a shortened instrument was adequate to identify ON.
Valera et al. (2014)	Unclear	n.r	n.r	When 136 members of a Spanish Ashtanga yoga community were sampled, almost 90% scored in clinical range for ON with the ORTO-15 cutoff score of 40 and 43% when a cut score of 35 was used. The authors do not describe their process of adapting the English items into Spanish, but infer that their participants were directed to an online version of the original (English) items.
de Souza and Rodrigues (2014)	ORTO-15 (Portuguese)	No items deleted	n.r	A second study involving the ORTO-15 in Portuguese. These authors used an instrument that was the result of a complicated, multistep "cultural adaptation" of the ORTO-15 by Pontes, Montagner, and Montagner (2014). Nutrition students ( $n = 150$ ), all women, were sampled and nearly 9 out of 10 showed "high risk behavior" for ON.
Brytek-Matera, Krupa, Poggiogalle, and Donini (2014)	Polish ORTHO-15 (Polish) <sup>a</sup>	1, 2, 8, 9, 13, 15	Cronbach's alpha = 0.64	Brytek-Matera et al. refer to the "ORTHO-15" when they clearly mean the ORTO-15. They translate the ORTO-15 from English to Polish using a complicated, multistep method. The resulting items were administered to 400 members of a university community. Through exploratory and confirmatory factor analysis, only nine items were "distinguished as valid" for use in a Polish population.
Brytek-Matera, Donini, Krupa, Poggiogalle, and Hay (2015)	Polish ORTHO-15 (Polish) <sup>a</sup>	No items deleted	n.r	Brytek-Matera et al. (2014) created the "ORTHO-15," a Polish version of the ORTO-15. Using it, this group administered it to 327 college students, identifying a majority of women and nearly half of men were "preoccupied with consuming healthy food." Their cutoff score was 40.
Gubiec, Stetkiewicz-Lewandowicz, Rasmus, and Sobów (2015)	ORTO-15 (Polish)	No items deleted	n.r	The sample consisted of 155 Polish nutrition students. The ORTO-15 was simply translated from English to Polish by one of the authors. Almost 60% of their sample was believed to have ON, using 40 as the cutoff score of the ORTO-15.

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